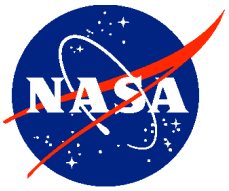

National Aeronautics and
Space Administration

NOT MEASUREMENT
SENSITIVE

NASA-STD-2805M
Effective August 11, 2009

MINIMUM HARDWARE CONFIGURATIONS

NASA TECHNICAL STANDARD

FOREWORD

This standard is approved for use by NASA Headquarters and all NASA Centers and is intended to provide a common framework for consistent practices across NASA programs.

The material covered in this standard is governed and approved by the NASA Information Technology Management Board. Its purpose is to define minimum hardware configurations necessary to support interoperability both between NASA end user computers and within the NASA operating environment. The standard establishes minimum "to keep" and minimum "to buy" hardware configurations. Adherence to this standard ensures compliance with federal requirements for desktop computers, laptops, and other end user devices.

Requests for information, corrections, or additions to this standard should be directed to the John H. Glenn Research Center at Lewis Field (GRC), Emerging Technology and Desktop Standards Group, MS 142-5, Cleveland, OH, 44135 or to *desktop-standards@lists.nasa.gov*. Requests for general information concerning standards should be sent to NASA Technical Standards Program Office, ED41, MSFC, AL, 35812 (telephone 256-544-2448). This and other NASA standards may be viewed and downloaded, free of charge, from the NASA Standards web page: http://standards.nasa.gov/.

(signature on file)

Bobby German
Chief Information Officer (Acting)

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Contents

1 SCOPE

1.1 Purpose

This Standard defines the current minimum desktop hardware configuration that will be used by NASA to support interoperability. These specifications apply to all NASA desktop and portable systems that are required to support interoperability.

1.2 Scope

Desktop hardware below this minimum configuration may be used in areas where interoperability is not required. However, Agency workstations used for interoperability must meet the criteria specified in section 3.3 of this document.

1.3 Waivers

The waiver process set forth in NPR 2800.1, paragraph 2.2.4, applies to this standard. The desktop standards group, in cooperation with the Chief Technical Officer, will continue to process waivers on behalf of the Principal Center for Workgroup Hardware and Software.

2 ACRONYMS AND DEFINITIONS

2.1 Acronyms

ODIN	The Outsourcing Desktop Initiative for NASA
EPEAT	Electronic Product Environmental Assessment Tool

2.2 Definitions

2.2.1 Desktop Computer

The term desktop computer is used generically to refer to traditional desktop systems as well as laptop computers, notebooks, tablets, engineering workstations, and similar platforms that are utilized to provide basic interoperability.

2.2.2 Minimum Workstation to Support Basic Interoperability

Workstations that support basic interoperability are defined by being networked, and by having users who exchange information electronically, including those users that perform any or all of the activities encompassed in the minimum office automation software suite defined below.

2.2.3 Minimum “To Keep” Workstation Hardware Configuration

The Minimum interoperable workstation hardware configuration that may be retained by a NASA organization.

2.2.4 Minimum “To Buy” Workstation Hardware Configuration

The minimum interoperable workstation hardware configuration that may be procured by a NASA organization. (The CIO at each Center is empowered and accountable for determining the performance/cost assessment for configurations that exceed the minimum hardware configuration and its associated cost. The Center CIO will also ensure that obsolete workstations are excessed on a one-for-one basis as new workstations are introduced.)

2.2.5 Minimum Interoperability Software Suite

The Minimum Interoperability Software Suite, is defined in NASA-STD-2804M, "*Minimum Interoperability Software Suite*."

3 GENERAL REQUIREMENTS

3.1 Architectural Compliance Requirements

NASA maintains a baselined and approved Information Technology Architecture. The architecture is predicated on:

- The selection of standards for a broad and cost-effective infrastructure using commercial off-the-shelf and well-supported open source products to the greatest extent practical
- Interoperability both within and external to NASA
- Flexibility for future growth
- Consistency with generally accepted consensus standards as much as feasible.
- Among these objectives, ensuring interoperability is one of NASA's most critical issues related to information technology.

At times, it is in NASA's best interest to specify commercial products as standards for an interoperable implementation of a particular set of related and integrated functions. The products themselves often include additional functionality or proprietary extensions not specified by this standard. While these products can be used to create higher-level interoperability solutions, these solutions may not be recognized within the context of the NASA interoperability environment and may be deprecated without warning by future revisions to this standard. Users of this standard are advised to apply appropriate caution when implementing proprietary or non-standard extensions, features and functions that go beyond the explicitly stated standard functionality.

3.2 Computing Platforms

This standard recognizes that NASA is a diverse agency with independent computing requirements. NASA will continue to support three desktop computing platforms: Windows, Macintosh, and Linux/UNIX.

3.3 Performance-Based Interoperability

The following tables establish the minimum desktop system hardware configurations that will support the agency-wide interoperability software suite as defined in NASA-STD-2804.

3.3.1 Minimum Hardware Requirements for PC and Macintosh systems

Component	Minimum to keep	Comments
Processor	32-bit x86, 867MHz or PowerPC G4	
Memory (RAM)	512MB[2]	
Hard Drive Capacity	10GB	
Display Resolution	1024x768	Office 2007 requirement
Graphics Technology	32 bit color	
Interfaces	USB	
Sound	analog stereo output	
Optical Drive	DVD+R: 16X DVD+RW: 8X DVD-R: 16X DVD-RW: 6X CD-R: 48X CD-RW: 32X	
Network Interface	10BASE-T ethernet	
Removable storage	Encrypted	see 3.3.3 below
Smart Card Reader	yes	see 3.3.4 below
Energy Saving	EPEAT Registered	see 3.3.5 below

3.3.2 Minimum to Buy Configurations

The process for selecting hardware configurations is currently being re-evaluated. The next revision of this document will revise how hardware requirements are specified. Processor and clock speed alone are no longer the only criteria that are indicative of system performance.

[2] Note that Windows 7 requires a minimum of 1 GB RAM

Minimum Hardware Requirements for PC Desktop systems
This system is configured for general office automation use.

Desktop (DT) PC **Minimum** To Buy		
PC	Specs	Comments
Processor	Quad-core or Greater	2.66 GHz
Memory (RAM)	4.0 GB 800 MHz	
Front Side Bus Speed	1333 MHz	
Hard Drive Capacity	320 GB SATA 7200 RPM	
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration
Display Size	22” LCD	
Display Resolution	1920x1200	
Optical Drive	16X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Open Slots	2 PCI 1 PCI-E 1X 1 PCI-E 16X	
Mouse	Optical USB w/ Scroll	
Keyboard	USB	
Sound	Analog stereo output	
Speaker(s)	Internal	
Headphones		
Ports	1 - serial	
USB Qty / Version	4 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet	
Smart Card Reader	NIST SP 800-96 compliant	Internal
Energy Saving	EPEAT registered	

Minimum Hardware Requirements for Macintosh Desktop systems
This system is configured for general office automation use.

Desktop (DT) Macintosh **Minimum** To Buy		
Macintosh	Specs	Comments
Processor	Dual-core or Greater	3.06 GHz
Memory (RAM)	4.0 GB	1066MHz DDR3 SDRAM - 2x2GB
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	1TB SATA, 7200 rpm	
Graphics Technology	64-bit, 512MB on board	
Display Size	24”	Glossy widescreen
Display Resolution	1920x1200	
Optical Drive	16X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Mouse	Optical USB w/ Scroll	
Keyboard	USB	
Sound	Analog stereo output	
Speaker(s)	Internal	
Headphones		
Ports	One FireWire 800 port Mini DisplayPort output with support for DVI, dual-link DVI, and VGA video	
USB Qty / Version	4 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet	
Smart Card Reader	NIST SP 800-96 compliant	External
Energy Saving	EPEAT registered	

Minimum Hardware Requirements for PC Laptop systems
This system is configured for users who use a laptop for their primary system who desire mobility.

Laptop (LT) PC **Minimum** To Buy		
PC	Specs	Comments
Processor	Dual-core or Greater	2.66 GHz
Memory (RAM)	4.0 GB 800 MHz	
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	250 GB SATA 7200 RPM	Free Fall Sensor or equivalent
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration with Docking Station
Display Size	15.4” WXGA+ LCD Widescreen	
Display Resolution	1440 x 900	
Optical Drive	16X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	5.5 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound	Analog stereo output	
Speaker(s)	Internal	
Headphones		
Ports	1 - 1394, ExpressCard 34/54	
USB Qty / Version	2 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	Internal
Energy Saving	EPEAT registered	
Webcam	1.3 megapixel built-in	
Microphone	Built-in	

Minimum Hardware Requirements for Macintosh Laptop systems
This system is configured for users who use a laptop for their primary system who desire mobility.

Laptop (LT) Macintosh **Minimum** To Buy		
Macintosh	Specs	Comments
Processor	Dual-core or Greater	2.93 GHz
Memory (RAM)	4.0 GB	1066MHz DDR3 SDRAM
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	320 GB SATA 5400 RPM	Free Fall Sensor or equivalent
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration
Display Size	15.4”	LED-backlit glossy widescreen
Display Resolution	1440 x 900	
Optical Drive	16X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	5.5 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound	Combined optical digital/headphone out	
Speaker(s)	Internal	
Headphones		
Ports	MagSafe power port Gigabit Ethernet port One FireWire 800 port (up to 800 Mbps) Two USB 2.0 ports (up to 480 Mbps) Mini DisplayPort Audio line in Audio line out ExpressCard/34 slot Security cable lock slot	
USB Qty / Version	2 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	External
Energy Saving	EPEAT registered	
Microphone	Built-in	

Minimum Hardware Requirements for PC Lightweight Laptop systems
This system is configured for the user who users who travel often and would like.

Lightweight Laptop (LLT) PC **Minimum** To Buy		
	Specs	Comments
Processor	Dual-core or Greater	2.66 GHz
Memory (RAM)	4.0 GB 800 MHz	
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	250 GB SATA 7200 RPM	Free Fall Sensor or equivalent
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration with Docking Station
Display Size	14.1” WXGA+ LCD Widescreen	
Display Resolution	1440 x 900	
Optical Drive	8X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	4.3 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound	Analog stereo output	
Speaker(s)	2 Internal	
Headphones		
Ports	1 - 1394, PCMCIA or ExpressCard 34/54	
USB Qty / Version	4 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	
Energy Saving	EPEAT registered	
Microphone	Built-in	

Minimum Hardware Requirements for Macintosh Lightweight Laptop systems
This system is configured for user who travel often and would like a lighter system.

Lightweight Laptop Macintosh (LLT) **Minimum** To Buy		
	Specs	Comments
Processor	Dual-core or Greater	1.86 GHz
Memory (RAM)	2.0 GB	1066MHz DDR3 SDRAM
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	250 SATA	
Graphics Technology	64-bit, 256MB on board	
Display Size	13.3”	LED-backlit glossy widescreen
Display Resolution	1280 x 800	
Optical Drive	8x SuperDrive (DVD±R DL/DVD±RW/CD-RW)	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	4.5 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound		
Speaker(s)	Internal	
Headphones		
Ports	Built-in AirPort Extreme (802.11n)4 Built-in Bluetooth 2.1 + EDR One USB 2.0 port	
USB Qty / Version	2 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	External
Energy Saving	EPEAT registered	
Microphone	Built-in	

Minimum Hardware Requirements for PC Ultra Lightweight Laptop systems
This system is configured for the user who travel extensively and are willing to give up functionality for a lighter system.

Ultra Lightweight Laptop (ULLT) PC **Minimum** To Buy		
	Specs	Comments
Processor	Dual-core or Greater	2.66 GHz
Memory (RAM)	4.0 GB 800 MHz	
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	250 GB SATA 7200 RPM	Free Fall Sensor or equivalent
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration with Docking Station
Display Size	13.3” WXGA+ LCD Widescreen	
Display Resolution	1280 x 800	
Optical Drive	8X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	3.3 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound	Analog stereo output	
Speaker(s)	Internal	
Headphones		
Ports	1 - 1394, PCMCIA or ExpressCard 34/54	
USB Qty / Version	4 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	Internal
Energy Saving	EPEAT registered	
Microphone	Built-in	

Minimum Hardware Requirements for Macintosh Ultra Lightweight Laptop systems
This system is configured for the user who travel extensively and are willing to give up functionality for a lighter system.

Ultra Lightweight Laptop Macintosh (ULLT) **Minimum** To Buy		
	Specs	Comments
Processor	Dual-core or Greater	1.86 GHz
Memory (RAM)	2.0 GB	1066MHz DDR3 SDRAM
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	128 GB Solid State	
Graphics Technology	64-bit, 256MB on board	
Display Size	13.3”	LED-backlit glossy widescreen
Display Resolution	1280 x 800	
Optical Drive	8x SuperDrive (DVD±R DL/DVD±RW/CD-RW)	External
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	3.0 lbs	Maximum weight
Mouse	Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound		
Speaker(s)	Internal	
Headphones		
Ports	Built-in AirPort Extreme (802.11n)4 Built-in Bluetooth 2.1 + EDR One USB 2.0 port	
USB Qty / Version	1 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet 802.11n	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	External
Energy Saving	EPEAT registered	
Microphone	Built-in	

Minimum Hardware Requirements for PC Workstation systems

Workstation PC **Minimum** To Buy		
	Specs	Comments
Processor	2 Quad Core or Greater[3]	2.66MHz
Memory (RAM)	16GB, 667MHz	
Front Side Bus Speed	1333MHz	
Hard Drive Capacity	Two 640GB SATA, 7200 RPM	
Graphics Technology	128-bit, 768MB, dual DVI	Supports Dual Display Configuration
Display Size	24” LCD	
Display Resolution	1920x1200	
Optical drive	16X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Open Slots	2 PCI-e 2.0	
Mouse	Optical USB w/ Scroll	
Keyboard	USB	
Sound	Analog stereo output	
Speakers	Internal	
Headphones		
Ports	1 - serial	
USB Qty / Version	5 External USB 2.0	
Network interface	10/100/1000 BASE-T Ethernet	
Smart card reader	NIST SP 800-96 compliant	
Energy saving	EPEAT registered	

[3] Dual core can be procured in place of quad core based on application requirements

Minimum Hardware Requirements for Macintosh Workstation systems

Workstation Macintosh **Minimum** To Buy		
	Specs	Comments
Processor	Two Quad Core or greater	2.66MHz
Memory (RAM)	8 GB,	1066MHz DDR3 ECC SDRAM
Front Side Bus Speed	1333MHz	
Hard Drive Capacity	Two 640GB SATA 7200 RPM	
Graphics Technology	128-bit, 768MB, dual DVI	Supports Dual Display Configuration
Display Size	24”	LED Cinema Display
Display Resolution	1920x1200	
Optical drive	18X VD±R DL/DVD±RW/CD-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Open Slots	3 PCI-e 2.0	
Mouse	Apple Mighty Mouse	
Keyboard	Apple USB	
Sound	Optical digital audio input and output TOSLINK ports Analog stereo line-level input and output minijacks	
Speakers	Internal	
Headphones		
Ports	1 - serial	
USB Qty / Version	5 External USB 2.0	
Network interface	10/100/1000 BASE-T Ethernet	
Smart card reader	NIST SP 800-96 compliant	
Energy saving	EPEAT registered	

Minimum Hardware Requirements for PC Tablet systems

Tablet (TAB) **Minimum** To Buy		
	Specs	Comments
Processor	Multi-core or Equivalent	1.2 GHz
Memory (RAM)	3.0 GB 800 MHz	
Front Side Bus Speed	1066 MHz	
Hard Drive Capacity	120 GB SATA 7200 RPM	Free Fall Sensor or equivalent
Graphics Technology	64-bit, 256MB on board	Supports Dual Display configuration with Docking Station
Display Size	12.1" WXGA LCD Widescreen, Touch Capacitive	
Display Resolution	1280 x 800	
Optical Drive	8X DVD+/-RW	
Removable Media	Encrypted 2 GB USB 2.0 memory stick	
Weight	3.5 lbs	
Mouse	Stylus, Trackpoint pad and Optical USB w/ Scroll	
Keyboard	Built-in	
Sound	Analog stereo output	
Speaker(s)	Internal	
Headphones		
Ports	1 - 1394, PCMCIA or ExpressCard 34/54	
USB Qty / Version	3 USB 2.0	
Network Interface	10/100/1000 BASE-T Ethernet	
Bluetooth	2.0	
Smart Card Reader	NIST SP 800-96 compliant	
Energy Saving	EPEAT registered	
Webcam	1.3 megapixel built-in	
Microphone	Built-in	

3.3.3 Removable Storage

Systems procured after this standard's effective date must include a small USB-based removable storage device of not less than 2 GB capacity. This storage device must be capable of storing data in encrypted form.

3.3.4 Smart Card Reader

All systems (not just newly procured ones) must include, a smart card reader that meets the requirements of NIST SP 800-96, and appears on the GSA's FIPS 201 Approved Product List, found at http://fips201ep.cio.gov/apl.php

NASA OCIO will provide SCM Microsystems SCR331 USB-attached readers. These readers, when used with appropriate driver software, meet NASA's requirements. The reader hardware will be made available to the Centers at no additional cost, and should be deployed as the Center infrastructure is available to support smart card use on desktops. In addition, the HSPD12 Desktop Integration Project is validating smart card readers of various interface types for use on NASA Desktops. Additional details about the HSPD12 compliance schedule, supported smart card reader devices on specific platforms will be provided as they become available. See http://etads.nasa.gov/DSI/ for current information.

3.3.5 Energy Saving

Newly procured systems must be EPEAT-registered. See http://www.epeat.net for the list of registered systems. All systems currently supplied by ODIN are registered.

Please refer to NASA-STD-2804 for requirements on how energy-saving features should be configured.

3.4 Section 508 Compliance Requirements

Hardware products procured after June 21, 2001 must be in conformance with Section 508 of the Rehabilitation Act. Complete information and guidance on addressing Section 508 requirements is available at:

http://www.section508.nasa.gov

4 REVIEW AND REPORTING REQUIREMENTS

4.1 Interoperability Reporting

Each Center CIO will establish the necessary processes and tools, both manual and automated, to report on an annual basis to the NASA CIO the hardware and software configuration of all workstations at their respective Centers. These data will contain sufficient information to ascertain if the workstation supports NASA employees or is Government-furnished equipment to a contractor, whether the equipment is required to be interoperable, and a description of the hardware architecture/environment. The report will specify the number of NASA employees that do not have access to interoperable workstations.

4.2 Basic Interoperability Standards Maintenance

This standard, and it's companion, NASA-STD-2804 Minimum Interoperability Software Suite, are maintained on behalf of the NASA CIO by the Emerging Technology and Desktop Standards group. Together, these standards define the software, hardware, and configurations necessary to ensure basic interoperability within the NASA information technology computing infrastructure.

This standard will be reviewed and updated on an as-required basis, not to exceed 12-month intervals. Participation in the revision process is open to all NASA employees. Details on how to be alerted of changes to the standards and/or comment on proposed updates can be found at:

http://etads.nasa.gov/DCS

This site also maintains interim guidance, position papers, software and hardware reviews, recommendations and other documentation intended to promote standardized basic interoperability.

5 DURATION

5.1 Duration

This standard will remain in effect until canceled or modified by the NASA CIO.

6 SUPPORTING DOCUMENTS

6.1 Supporting Documents

Supporting documents and additional information related to this standard may be found at:

http://etads.nasa.gov/DCS
http://etads.nasa.gov/DSI/
http://pki.nasa.gov/